death and decomposition. The agents themselves are invariably secondary metabolites arising from the shikimate or acetate/mevalonate pathways, including a vast array of phenols and phenylpropanes, acetogenins, terpenoids, steroids and alkaloids. However, many interactions remain poorly understood because they are interwoven with the complexities of plant growth in an ever-changing environment. Our challenge is to explain how allelochemicals act, but this is always complicated by chemical and biological diversity and interactions with stress phenomena, such as the prevailing growth conditions of temperature and the availability of light, water, space, nutrients and disease. Further complexity arises with the realisation that allelochemical inhibitions may result from the combined effects of several compounds of the same or different chemical class, and that phytotoxicity may result from action at many cellular sites rather than one discrete mode of action. Therefore, to unravel the precise details of allelopathic interactions is a formidable task and a major academic and commercial challenge.

This book provides, in 25 chapters, a collection of recent findings in allelopathy from leaders in the field, especially in agroecosystems, and is an important and thought-provoking account of the subject. After a well balanced overview, chapters 2 to 6 consider interactions with specific organisms, followed by six chapters dealing with proposed mechanisms of action. Chapters 13 to 18 focus on allelopathy in agroecosystems and the final seven chapters present opportunities for biocontrol and the possible applications of allelochemistry to the agrochemical industry. Each chapter is clearly presented and fully referenced, and the editors have produced the volume to a high standard.

Certain common points do emerge from the volume, perhaps the main one being that agricultural productivity and yield are routinely influenced by allelopathy. Utilising allelopathy may therefore aid modern agriculture. For example, novel crop rotations may be developed to capitalise on allelopathic activity in combination with herbicide use for weed control. Furthermore, allelochemicals are a readily available source of novel chemicals with biological activity towards plants. Their potential for exploitation as leads for herbicide development remains enormous.

There is something in this volume for all disciplines that contribute to Pesticide Science, from secondary product chemistry to biological control, and it can be recommended as providing an excellent background text to an important yet complex topic.

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Porphyric pesticides: Chemistry, toxicology and pharmaceutical applications, ed. S. O. Duke & C. A. Rebeiz, American Chemical Society, Washington DC, 1994, x + 317 pp., price US$79.95.
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A major advance in pesticide chemistry in recent years has been the development of new and potent molecules that act through the photodynamic action of porphyrins. All the major agrochemical companies own patents in this area and have dedicated laboratories and personnel to exploit their agrochemical potential. Initial commercial success with herbicides has more recently generated further lines of interest in the development of porphyric insecticides and the use of porphyrins as chemotherapeutic agents in humans, particularly in tumour therapy.

All organisms synthesize cycle tetrapyrroles which play central roles in life. Examples include the cytochromes in respiratory electron transport, the oxygen carrier haemoglobin and chlorophyll, the principal pigment in photosynthesis, to name but a few. Chemicals that inhibit the biosynthesis of tetrapyrroles lead to the accumulation of intermediates that are termed photodynamic compounds, which, in the presence of light and molecular oxygen, will generate highly reactive oxygen species, especially singlet oxygen. These free radicals are toxic to all living things since singlet oxygen is highly reactive to membrane lipids causing their photoperoxidation and hence membrane breakdown. A major and successful class of herbicides that includes the nitrodiphenyl ethers, oxadiazoles and *N*-phenylimides inhibit the enzyme protoporphyrinogen oxidase, the last common enzyme to both haem and chlorophyll biosynthesis, leading to the accumulation of the photodynamic intermediate protoporphyrinogen IX. The singlet oxygen attack in this case selectively kills weeds and the lack of chlorophyll in treated plants is clearly evident.

Fourteen of the 21 chapters of this book consider the porphyric pesticides as herbicides in great detail, covering their synthesis, chemical groups, structure–activity relationships, characterisation in plants and mode of action. The remaining seven chapters examine the use of photodynamic porphyrins as insecticides and pharmaceuticals, and include details of their mammalian toxicology and potential for use in cancer therapy.

The editors deserve praise both for their contributions to this field and for producing an excellent text. Its novelty and greatest value is that it brings together the findings of a very diverse group of scientists involved in several aspects of porphyrin research. Each chapter is well presented and referenced, and a wealth of relevant information is included. This book is a valuable source for all workers in the field and in particular pesticide scientists.

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